

Date: Tue, 28 Sep 93 04:30:16 PDT
From: Ham-Ant Mailing List and Newsgroup <ham-ant@ucsd.edu>
Errors-To: Ham-Ant-Errors@UCSD.Edu
Reply-To: Ham-Ant@UCSD.Edu
Precedence: Bulk
Subject: Ham-Ant Digest V93 #61
To: Ham-Ant

Ham-Ant Digest Tue, 28 Sep 93 Volume 93 : Issue 61

Today's Topics:

 Gamma Matches (2 msgs)
 hamstick antenna
 HF Discone Dirivitive Info Needed
 Horizontal Loops
 More details on hombrew IsoLoop(tm) (2 msgs)
 Transmission Line Losses #2
 Wire J-pole? (3 msgs)

Send Replies or notes for publication to: <Ham-Ant@UCSD.Edu>

Send subscription requests to: <Ham-Ant-REQUEST@UCSD.Edu>

Problems you can't solve otherwise to brian@ucsd.edu.

Archives of past issues of the Ham-Ant Digest are available
(by FTP only) from UCSD.Edu in directory "mailarchives/ham-ant".

We trust that readers are intelligent enough to realize that all text
herein consists of personal comments and does not represent the official
policies or positions of any party. Your mileage may vary. So there.

Date: Mon, 27 Sep 1993 17:57:35 GMT
From: news.cerf.net!kaiwan.com!wetware!sgiblab!news.kpc.com!kpc!
nat@network.ucsd.edu
Subject: Gamma Matches
To: ham-ant@ucsd.edu

Hi,

I finally orderd enough aluminium tubing to build a 3 element monobander
for 20 meters. I was flipping through the ARRL Antenna Handbook and came across
gamma match as a method of matching coax lines to a beam. The book was very
sketchy on how it works and on construction techniques for gamma matches.

The book had a program to compute gamma matches. The result of the
progam is "Gamma length" and "Gamma Capacitor". Here is how I am interpreting
the results. In my case the Gamma Capacitor value was 140pf. I decide to
use a coaxial cable 33pf/ft to build my gamma match. So I need to use a section
of coax $140/33 = 4.24$ ft long as my gamma rod. "Gamma length" was 44". So I

measure 44" along the coax and shave off the insulation and use a piece of Al to connect the coax braid to the driven element. I also put enough plastic supports to ensure that the gamma coax stays parallel to the driven element.

Is there better ways to construct a gamma rod eg. remove the outer insulation and braid from the coax. Stuff the inner conductor and dielectric into a small dia Al tubing and hope the capacitance/foot has not changed drastically.

The gamma match approach looks appealing as the driven element can be one continuous piece of tubing.

The questions I have are:

1. Am I interpreting the "Gamma Length" and "Gamma Capacitor" values correctly.

2. How does it work.

3. Construction and tuning techniques for Gamma Matches.

If I get innundated with replies I will summarize the replies to the net.

Thanks in advance

Nat

--

Natarajan Gurumoorthy AB6SJ Kubota Pacific Computer, Inc.
nat@kpc.com 2630 Walsh Avenue
Phone 408 987 3341 Santa Clara, California 95051.

Date: 27 Sep 93 19:39:27 GMT
From: sdd.hp.com!col.hp.com!fc.hp.com!jayk@hplabs.hpl.hp.com
Subject: Gamma Matches
To: ham-ant@ucsd.edu

Natarajan Gurumoorthy (nat@kpc.com) wrote:

: Is there better ways to construct a gamma rod eg. remove the outer
: insulation and braid from the coax. Stuff the inner conductor and dielectric
: into a small dia Al tubing and hope the capacitance/foot has not changed
: drastically.
: Nat

I use 3/8 inch aluminum tubing for the rod and slide the coax minus the jacket and braid right in the tubing. As I recall either .49 or .58 wall tubing will work but the fit is a bit tight on the .58 (from memory). I use four feet of tubing on 20 meters, three feet on 15m, and two feet on 10m. These lengths seem to give a good match by adjusting

Now for the bad news. You will have a cleaner pattern on your yagi if you use some kind of balanced matching system instead of a gamma. Something like a T match (more or less a gamma match on each side of the driven element) works well. It will require you to make two gamma matches and have a 4:1 balun. Its also a bit harder to tune than a single gamma.

73, Jay KOGU jayk@fc.hp.com.

In article <27aetr\$de3@samba.oit.unc.edu>, Ian.Cassell@launchpad.unc.edu (IAN CASSELL) wrote:

Ian -

I just bought a 75 meter Ham Stick. Price was \$19.95, from a commercial vendor at a local hamfest.

It is probably a little lossy, since it appears to have a little more bandwidth than the Hustler with resonator, and is about the same length overall. My main complaint is the fact you can't tear it down to smaller dimensions, without messing up the tuning. It is a little over 7 feet long. The Hustler comes apart, and has a folding mast that fits in the trunk of my car.

My reason for buying it, was to use two mobile antennas mounted on a bracket, as a portable dipole. The resulting 75 meter assembly, is about 15 feet long. I haven't tried it yet. I think the bracket was made by the same company.

The Ham Stick was manufactured by Lakeview Co., Inc., of 3620-9A Whitehall

Rd., Anderson, SC 29624. Telephone is (803)-226-6990. The label on the package indicates it is made by "WD4BUM MOBILE ANTENNAS".

73, Fred, K4DII

Date: Mon, 27 Sep 1993 18:02:42 GMT
From: nsc!voder!berlitz.nsc.com!rtodd@decwrl.dec.com
Subject: HF Discone Derivative Info Needed
To: ham-ant@ucsd.edu

Several (20-30) years ago I remember reading an article in either "Ham Radio" magazine or "73" about an HF all/many band vertical derived from a discone. The author started from the format of a multi-rod(wire) vhf discone design where the antenna surfaces were reduced to many linear elements. He then began removing wires from the disc and cone eventually arriving at only two wires in each "surface" with still respectable performance. His next experiment was to start rotating the axis of the disc wires away from the plane containing the cone wires. All the while he seemed to maintain respectable performance and swr relative to dipole.

I would like to know if anyone has tried such an antenna or if anyone has the references to that article. I do have the magazines but they are snuggled away in the attic in neat packets and the wife wants strong justification to minimize the amount of disaster area generation before I go dig out the mags. I thought it would be a good fall project to put this antenna to the MININEC test prior to erecting one for myself.

Any help would be greatly appreciated.

TNX es 73

Ron, K3FR

reply to rtodd@thoreau.nsc.com

Date: Mon, 27 Sep 1993 15:51:04 GMT
From: mac_072.pppl.gov!user@princeton.edu
Subject: Horizontal Loops
To: ham-ant@ucsd.edu

In article <7989.2c99ee0c@hayes.com>, bcoleman@hayes.com (Bill Coleman)

wrote:

>
> In article <9309141953.AA23289@chinalake.navy.mil>,
MUSCHINSKE%39A.DEcnet@sunman.chinalake.navy.mil writes:
> >
> > Does anyone have any experience with full wave horizontal loop antennas?
> > I am interested in data, anecdotes, stories, tall tales, etc., on these
> > antennas. I am ESPECIALLY interested in anyone who has used a 160m
> > full wave horizontal loop.
>
> I used a 80m full wave horizontal loop at my station for about 3 years. Mine
> was 270' of 18 ga stranded insulated wire about 15' up. Fed with RG-8x coax.
>
> It tuned up nicely on all bands with a simple tuner. Performance was OK.
> Although the static levels were low, the signal levels weren't stupenduous
> either. 80m performance close in was real good. 40m as well. Higher bands
> worked, but not as well as a tribander (of course). I mostly used the antenna
> on 80 and 40.
>
> I did have one problem go undetected for a few days when the coax center
> conductor worked loose. Antenna would tune up on the tuner, but signal levels
> were WAY down. Fixed that one quickly.
>
> Basically, the antenna has a rather high angle of radiation this close to the
> ground. OK for nearby work, but not real good for DX. Ground losses are also
> enormous. Putting it further off the ground helps, but you need four supports
> to do that. Loop also has a somewhat lower impedance than a dipole at multiples
> of the fundamental, so it could be easier to match with your tuner.
>
> I finally took it down about 3 years ago. I have a 125' doublet at 45'
> instead. The doublet works better than the loop, but it is much higher. Since
> it only requires two supports (or one for an inverted V) a doublet seems to
> be a much better choice than the loop.
>
> --
> Bill Coleman, AA4LR ! CIS: 76067,2327 AppleLink: D1958
> Principal Software Engineer ! Packet Radio: AA4LR @ W4QO
> Hayes Microcomputer Products, Inc. ! UUCP: uunet!hayes!bcoleman
> POB 105203 Atlanta, GA 30348 USA ! Internet: bcoleman%hayes@uunet.uu.net
> Disclaimer: "My employer doesn't pay me to have opinions."
> Quote: "The same light shines on vineyards that makes deserts." -Steve Hackett.

I have used a full-wave 160 meter horizontal loop for the two years that I have had my station operational. The antenna consists of about 540 feet of #14 copper wire strung roughly in a square around the border of the property and supported by trees. The height of the antenna varies from 40 to 70 feet, depending on what tree branches I could manage to get the supporting ropes over. I feed the antenna with 450 ohm ladder line in the

center of one of the legs. The ladder line runs down to a Radio Works 4:1 balun, then I have a Radio Works line isolater and a lightning arrestor in the coaxial line (CQ-213 from the Wire Man), which goes through the wall of the house into the shack. I put some effort into a good ground for the station -- a couple of good quality ground rods, copper pipe, and braid. I use a Heathkit antenna tuner to match the incoming coaxial feedline to my Drake TR-7 transceiver.

In the two years I have been active, I've managed to work 211 (176 confirmed) countries (and WAS) with this setup. On 160, I've worked North America (30 states including Washington), Europe (G, ON, UA3), the Caribbean and South America. On 80, I've worked much EU, ZS, 4X and UD, North & South America. On 40, 30, 20, 17, 15, 12 and 10 meters I've worked all continents. I use CW almost exclusively, with no packet spotting (obviously a hard-core type). The antenna is curious in that I don't get many strong signal reports (and when there's a monster pileup, I just don't get through), but I do get LOTS of replies. For example, last night there was a WB6 working portable in Honduras on 10 MHz. I worked him, getting my "gentleman's C" 559, on my first call, though I could hear about a dozen other U.S. stations calling. Yesterday morning I called A71CW on 18 MHz and worked him with a 559 on my first try through the Europeans.

The antenna tunes easily on all bands, with only minor changes during wet weather. Performance degrades drastically during poor or unsettled ionospheric conditions -- that's when the Big Guns get through, and I'm not even heard.

I ported NEC2 to an SGI workstation under UNIX, and sprung for the manuals from NTIS. Using the Sommerfeld-Norton option for ground and estimating my local parameters, I've produced a model of my antenna. From the NEC model, it's not clear to me why the antenna works as well as it does. A possible explanation is that my QTH is at the crest of a hill -- it's all downhill to the Atlantic Ocean about 30 miles away...

George B. Christianson | INTERNet: gchristianson@pppl.gov
Princeton University | else: gchristi@phoenix.princeton.edu
Plasma Physics Laboratory | Phone: (609)-243-3270 FTS: 340-3270
P.O. Box 451 | Amateur Radio: NJ2P

Princeton, NJ 08543, USA
-----|-----

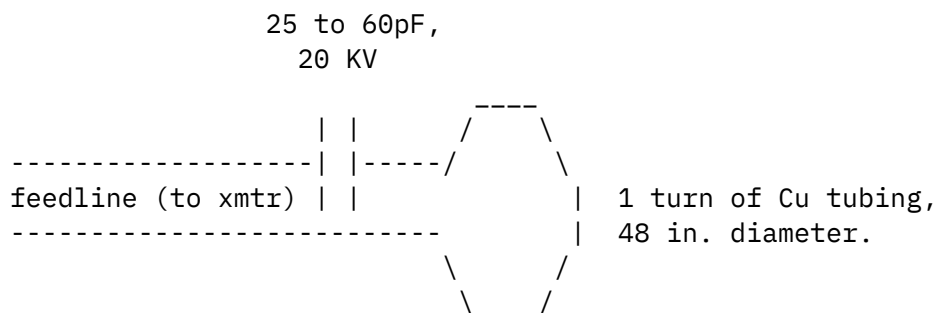
Date: Mon, 27 Sep 1993 15:52:36 GMT
From: beta.lanl.gov!tjf@lanl.gov
Subject: More details on hambrew IsoLoop(tm)
To: ham-ant@ucsd.edu

Hi All,

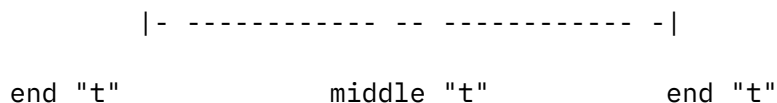
I got lots of requests to post more info about the homebrew loop antenna I built last weekend. Here are the details. I used 1/2 inch copper pipe bent into a circle 48" in diameter. My simple calculations show that this loop has an inductive reactance of 235 ohms at 14.05 Mhz. Thus to resonate at this frequency, $X_c = 235$ which leads to a capacitance of about 48 pF. I had a bunch of doorknob capacitors rated to 20-30KV, so I put several in series. Three 180pF's gave me 60pF. Too high, I said, but I had a tuner. Well, in my backyard, this seemed to give me less than 1.5 SWR from 14.025 to 14.075, with almost 1:1 at 14.05! Now 60 pF gives a capacitive reactance of 185 ohms which is 50 less than the 235 ohms of inductive reactance! Just a coincidence it is 50 ohms....? Well, when I set it up over my brick patio, I get a different resonance! I think this is because the loop is only about 6 feet off the ground (also, I watered the lawn that day, it was a Sunday, etc..... ;^)

I used doorknob caps as the voltages on such a loop can easily get to the kilovolt range, so I am told.

Here is a drawing courtesy of William Graham - VE6UUG, who posted to me to ask a question:

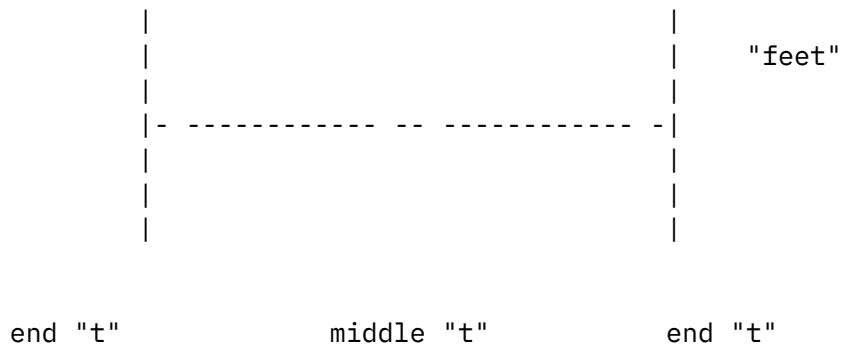


The feedline is coax. I attached the caps and SO-239 to the loop with hose clamps! The PVC frame is built from short sections of 3/4" thick wall tubing and "t" sections. Top view looks like this:



The "t" are not threaded, but held together by friction

to allow easy take-down. I have a 5-foot length that I put into the middle "t" as the mast. An identical section below forms the 'feet' with the addition of 4 more 2-foot lengths stuck into the end "t" 's instead of the copper pipe. Top view looks like this:



That's all there is to it! By the way, thin-walled tubing is too flimsy for the 1/2-inch pipe. You might try 1/4 inch.

So far, it has worked like a champ with my MFJ 9020. I'll be testing with some real power if I can get it up a bit higher.....beware of high voltages on this loop!

Tom
KJ5LT

Date: 27 Sep 93 15:40:39 EST
From: dale.ksc.nasa.gov!titan.ksc.nasa.gov!k4dii.ksc.nasa.gov!user@ames.arpa
Subject: More details on hambrew IsoLoop(tm)
To: ham-ant@ucsd.edu

In article <1993Sep27.155236.9800@newshost.lanl.gov>, tjf@beta.lanl.gov (Tom J Farish) wrote:

> I used doorknob caps as the voltages on such a loop can
> easily get to the kilovolt range, so I am told.

Tom-

You have the right idea about the voltage, but don't doorknob caps use ceramic elements? If so, you may experience problems at high power, from dielectric heating of the ceramic, causing a shift in capacitance.

This effect is one of two I've heard of with ceramic capacitors. The other has to do with the piezo-electric effect. It seems that some ceramic capacitors will develop a voltage across their terminals, in response to mechanical vibration. However, I doubt this would be a problem in your application!

73, Fred, K4DII

Date: Tue, 28 Sep 1993 00:21:57 GMT
From: olivea!pagesat!indirect.com!indirect.com!kg7bk@uunet.uu.net
Subject: Transmission Line Losses #2
To: ham-ant@ucsd.edu

Here's something not everyone has thought about. Assume a half-wave dipole antenna on 17 meters with an impedance of 75 ohms resistive. Assuming one has an antenna tuner with a balanced output, is one better off with 100' of (a) RG-59, (b) 300 ohm tubular, (c) 450 ohm ladder-line?

100' of RG-59 with an SWR of 1/1 on 17 meters has losses of 1.7 db.

100' of 300 ohm tubular with an SWR of 4/1 has losses of 0.9 db.

100' of 450 ohm ladder-line with an SWR of 6/1 has losses of 0.6 db.

That doesn't count the losses in the antenna tuner but is still interesting considering the cost of coax vs ladder-line.

Of course, one can put in a series-section transmission line transformer to cut the losses on the 300 ohm tubular line to 0.4 db and on the 450 ohm ladder-line to only 0.2 db. Then one only needs a balun at the transmitter instead of an antenna tuner.

73, kg7bk

Date: 27 Sep 93 14:19:54 GMT
From: ogicse!uwm.edu!cs.utexas.edu!gerald@cc.utexas.edu!nuntius@network.ucsd.edu
Subject: Wire J-pole?
To: ham-ant@ucsd.edu

Subject: Wire J-pole? From: Douglas J Renze, drenze@icaen.uiowa.edu In article
<1993Sep23.145919.9022@news.uiowa.edu> Douglas J Renze,
drenze@icaen.uiowa.edu writes: >Can somebody point me to where I can dig

up
ingfo on building a >wire J-pole antenna for use with my 2-m HT? I need
just about *anything* >for gain over my ducky when I'm using it as a base
station...and when I'm >at my computer with m ducky, I get a nice RFI tone
over the local repeater. :-(> >Tnx es 73 de Doug N0Z?? >05W 03D 20H 59M
and
counting (and no, I'm not transmitting...I'm talking about >reception at
the
moment. :-))... > >-- >__ /| | Douglas J Renze | Charter
Member, Popular Front >\'o.0' | +1 319 337 4664 | for
Revolutionary Darwinism: >=(___)= | drenze@isca.uiowa.edu | > U |
Douglas-Renze@uiowa.edu | Evolution Now!

I am aware of two articles. The first, by John Belrose VE2CV appeared in
QST,
April 1982, p. 43 and the second in Ham Radio for August 1983 in Orr's
column
on page 40.

Incidentally, Belrose found that the dimensions were somewhat sensitive
to the
velocity factor of the twin lead he used and his design specified Belden
8230
ribbon. If anyone knows if this is still available and/or where one can
obtain
this, I would like to hear from them.

Date: Mon, 27 Sep 93 18:03:31 GMT
From: mnemosyne.cs.du.edu!nyx!bdavidso@uunet.uu.net
Subject: Wire J-pole?
To: ham-ant@ucsd.edu

There's a file on many HAM FTP sites called J-POLES that has excellent
wire JPLOE construction hints. OR, E-Mail me & I'll send it out.

/s/ Bill WB8ZQK

Date: 27 Sep 93 15:29:31 EST
From: dale.ksc.nasa.gov!titan.ksc.nasa.gov!k4dii.ksc.nasa.gov!user@ames.arpa
Subject: Wire J-pole?
To: ham-ant@ucsd.edu

In article <286sqa\$99m@geraldo.cc.utexas.edu>, Barry Newberger, W5KH
<bsn@fusion.ph.utexas.edu> wrote:

> I am aware of two articles. The first, by John Belrose VE2CV appeared in
 > QST, April 1982, p. 43 and the second in Ham Radio for August 1983 in Orr's
 > column on page 40.
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 > to the velocity factor of the twin lead he used and his design specified Belden
 > 8230 ribbon. If anyone knows if this is still available and/or where one can
 > obtain this, I would like to hear from them.

Barry-

What a coincidence! Over the weekend, I came across a BASIC program
 derived from one of the Belrose articles. It was on one of those
 share-ware/public domain Ham Radio CD's, on a local BBS. Since it is
 short, I'll list it below.

73, Fred, K4DII

```

-----
1 REM Data taken from article in April 1982 QST by John S. Belrose, VE2CV
2 REM Program written by Marv Hayes, NF6G, 3/20/83.
90 PRINT "These calculations are for a 'J' antenna made from 300 ohm"
91 PRINT "twin-lead such as Belden 8230 with a velocity factor of .8"
95 PRINT " "
100 INPUT "Please enter the design frequency in mHz";FREQ
105 PRINT " "
200 LAMBDA = 11811/FREQ
300 STUB = .83 * LAMBDA / 4
400 RADIATOR = .9650001 * LAMBDA / 2
500 TAP = LAMBDA * .0136
600 GAP = .25
1000 PRINT "DESIGN          LENGTH OF    LENGTH OF      TAP          GAP"
1100 PRINT " FREQ          1/4 WAVE    RADIATOR      DISTANCE
DISTANCE"
1200 PRINT "(mHz)          (inches)    (inches)      (inches)
(inches)"
1300 PRINT " "
1400 PRINT FREQ, STUB, RADIATOR, TAP, GAP
1890 PRINT " "
1900 PRINT "If this antenna will be inclosed inside a PVC plastic tube,"
1901 PRINT "the dimensions should be reduced (multiply by 0.95).\"
1905 PRINT " "
1910 STUB = STUB * .95
1920 RADIATOR = RADIATOR * .95
1930 TAP = TAP * .95
1950 PRINT FREQ, STUB, RADIATOR, TAP, GAP
2000 END
-----
-----

```

Date: Mon, 27 Sep 1993 15:27:55 GMT
From: world!swebb@uunet.uu.net
To: ham-ant@ucsd.edu

References <1993Sep22.183313.13702@Csl.Stanford.EDU>,
<clark.272.2CA291B1@odie.ee.wits.ac.za>, <281vkp\$d4@hpsc.sc.hp.com>
Subject : Re: Coils in Cellular Antennas

rkarlqu@scd.hp.com (Richard Karlquist) wrote:

If this scheme is only worth 2 or 3 dB., why not just use a 5/8 wave vertical to get the same gain? (Possible answer: the notorious ground plane dependency of 5/8 wave antennas).

Also, why not just double the transmitter power to get the extra 3 dB. After all, EIRP is what counts in cellular, not transmitter power (as in ham radio). I'll bet lots of cellular owning yuppies would pay a premium for their phone to get rid of those silly looking "pigtailed" on their roofs.

It really has to do with radiation angle. The radiation angle of 1/4-wave and 5/8-wave antennas over limited-size ground planes (less than about 10 wavelengths) is quite elevated, or at least very sensitive to the size of the ground plane. The upper portion of the cellular antenna is essentially ground-plane independent, and dominates the pattern.

-Spence
--

+++++
Webb & Associates +
(an IDA International affiliate) +

Date: 27 Sep 93 23:19:31 GMT
From: agate!howland.reston.ans.net!vixen.cso.uiuc.edu!moe.ksu.ksu.edu!
hobbes.physics.uiowa.edu!news.uiowa.edu!icaen.uiowa.edu!drenze@ucbvax.berkeley.edu
To: ham-ant@ucsd.edu

References <1993Sep23.145919.9022@news.uiowa.edu>,
<286sqa\$99m@gerald.cc.utexas.edu>, <fred-
mckenzie-270993152211@k4dii.ksc.nasa.gov>wa.ed
Subject : Re: Wire J-pole?

fred-mckenzie@ksc.nasa.gov (Fred McKenzie) writes:

>In article <286sqa\$99m@geraldo.cc.utexas.edu>, Barry Newberger, W5KH
><bsn@fusion.ph.utexas.edu> wrote:
>> I am aware of two articles. The first, by John Belrose VE2CV appeared in
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>share-ware/public domain Ham Radio CD's, on a local BBS. Since it is
>short, I'll list it below.

>73, Fred, K4DII

Even bigger coincidence? I picked up a copy of the April '82 QST at the last
hamfest I went to. Guess I didn't read it closely enough before I posted. :-)

73, Doug, N0YVW

```
--
__  /|  | Douglas J Renze, N0YVW  |      Charter Member, Popular Front
\ 'o.O' | +1 319 337 4664         |      for Revolutionary Darwinism:
=(___)= | drenze@isca.uiowa.edu   |
      U  | Douglas-Renze@uiowa.edu |      Evolution Now!
```

End of Ham-Ant Digest V93 #61
